What is claimed is:

1. A computer implemented method of analyzing a signal comprising:

inputting the signal;

extracting a set of Intrinsic Mode Functions from the signal; and

generating a set of mean frequency functions from the Intrinsic Mode Functions.

2. The computer implemented method as in claim 1 further comprising: the step of summing up the mean frequency functions.

3. The computer implemented method as in claim 2 further comprising the step of:

displaying the sum of the mean frequency functions.

4. The computer implemented method as in claim 1, wherein the step of generating a set of mean frequency functions comprises:

computing the mean frequency at a point along the time scale for one of the Intrinsic Mode Functions; and

continuing to perform the computing step for all of the Intrinsic Mode Functions.

5. The computer implemented method as in claim 4, wherein the mean frequency at a point under consideration is defined as follows:

$$\varpi = \frac{1}{12}\{\frac{1}{T_4} + (\frac{1}{T_2^1} + \frac{1}{T_2^2}) + (\frac{1}{T_1^1} + \frac{1}{T_1^2} + \frac{1}{T_1^3} + \frac{1}{T_1^4})\}$$

wherein

ϖ is mean frequency;

T_1^x is full periods (x = 1, 2, 3, and 4) enclosing the poin under consideration;

T_2^y is half periods (y = 1 and 2) enclosing the point under consideration; and

T_4 is a quarter period enclosing the point under consideration;

6. The computer implemented method as in claim 4, wherein the mean frequency at a point under consideration is defined as follows:

$$\varpi = \frac{1}{7}\{\frac{1}{4T_4} + (\frac{1}{2T_2^1} + \frac{1}{2T_2^2}) + (\frac{1}{T_1^1} + \frac{1}{T_1^2} + \frac{1}{T_1^3} + \frac{1}{T_1^4})\}$$

wherein

ϖ is mean frequency;

T_1^x is full periods (x = 1, 2, 3, and 4) enclosing the poin under consideration;

T_2^y is half periods (y = 1 and 2) enclosing the point under consideration; and

T_4 is a quarter period enclosing the point under consideration;

7. The computer implemented method as in claim 1, wherein extracting a set of Intrinsic Mode Functions from the signal comprises:

recursively sifting the signal via Empirical Mode Decomposition to extract an intrinsic mode function indicative of an intrinsic oscillatory mode;

generating a residual signal by subtracting the intrinsic mode function from the signal;

treating the residual signal as the signal during a next iteration of said recursive sifting step; and

iterating to perform said recursive sifting to generate an

n-th intrinsic mode function indicative of an n-th intrinsic oscillatory mode until a stopping condition is met.

8. The computer implemented method of analyzing a signal according to claim 7, wherein said recursive sifting including:

identifying local maximum values in the signal;

constructing an upper envelope of the signal from the identified local maximum values;

identifying local minimum values in the signal;

constructing a lower envelope of the signal from the identified local minimum values;

determining an envelope mean from the upper and lower envelopes;

generating a component signal by subtracting the envelope mean from the signal;

treating the component signal as the signal; and

recursively performing said sifting until successive component signals are substantially equal.

9. The computer implemented method of analyzing a signal according to claim 8, wherein the step of constructing a lower envelope of the signal includes connecting the identified local minimum values with straight lines; and the step of constructing an upper envelope of the signal includes connecting the identified local maximum values with straight lines.

10. The computer implemented method of analyzing a signal according to claim 8, wherein the step of constructing a lower envelope of the signal includes connecting the identified local minimum values with cubic spline fitting; and the step of constructing a upper envelope of the signal includes connecting

the identified local maximum values with cubic spline fitting.

11. A computer implemented method of analyzing a signal comprising:

inputting the signal;

extracting a set of Intrinsic Mode Functions from the signal; and

generating instantaneous frequency based on critical points of the signal.

12. The computer implemented method as in claim 11, wherein the step of generating instantaneous frequency based on critical points comprises:

generating a set of mean frequency functions from the Intrinsic Mode Functions.

13. The computer implemented method as in claim 12 further comprising: the step of summing up the mean frequency functions.

14. The computer implemented method as in claim 13 further comprising the step of:

displaying the sum of the mean frequency functions.

15. The computer implemented method as in claim 12, wherein the step of generating a set of mean frequency functions comprises:

computing the mean frequency at a point along the time scale for one of the Intrinsic Mode Functions; and

continuing to perform the computing step for all of the Intrinsic Mode Functions.

16. The computer implemented method as in claim 15, wherein the mean frequency at a point under consideration is defined as

follows:

$$\varpi = \frac{1}{12}\{\frac{1}{T_4} + (\frac{1}{T_2^1} + \frac{1}{T_2^2}) + (\frac{1}{T_1^1} + \frac{1}{T_1^2} + \frac{1}{T_1^3} + \frac{1}{T_1^4})\}$$

wherein

ϖ is mean frequency;

T_1^x is full periods (x = 1, 2, 3, and 4) enclosing the poin under consideration;

T_2^y is half periods (y = 1 and 2) enclosing the point under consideration; and

T_4 is a quarter period enclosing the point under consideration;

17. The computer implemented method as in claim 15, wherein the mean frequency at a point under consideration is defined as follows:

$$\varpi = \frac{1}{7}\{\frac{1}{4T_4} + (\frac{1}{2T_2^1} + \frac{1}{2T_2^2}) + (\frac{1}{T_1^1} + \frac{1}{T_1^2} + \frac{1}{T_1^3} + \frac{1}{T_1^4})\}$$

wherein

ϖ is mean frequency;

T_1^x is full periods (x = 1, 2, 3, and 4) enclosing the poin under consideration;

T_2^y is half periods (y = 1 and 2) enclosing the point under consideration; and

T_4 is a quarter period enclosing the point under consideration;

18. The computer implemented method as in claim 11, wherein extracting a set of Intrinsic Mode Functions from the signal comprises:

recursively sifting the signal via Empirical Mode Decomposition to extract an intrinsic mode function indicative of an intrinsic oscillatory mode;

generating a residual signal by subtracting the intrinsic mode function from the signal;

treating the residual signal as the signal during a next iteration of said recursive sifting step; and

iterating to perform said recursive sifting to generate an n-th intrinsic mode function indicative of an n-th intrinsic oscillatory mode until a stopping condition is met.

19. The computer implemented method of analyzing a signal according to claim 18, wherein said recursive sifting including:

identifying local maximum values in the signal;

constructing an upper envelope of the signal from the identified local maximum values;

identifying local minimum values in the signal;

constructing a lower envelope of the signal from the identified local minimum values;

determining an envelope mean from the upper and lower envelopes;

generating a component signal by subtracting the envelope mean from the signal;

treating the component signal as the signal; and

recursively performing said sifting until successive component signals are substantially equal.

20. The computer implemented method of analyzing a signal according to claim 19, wherein the step of constructing a lower envelope of the signal includes connecting the identified local minimum values with straight lines; and the step of constructing an upper envelope of the signal includes connecting the identified local maximum values with straight lines.

21. The computer implemented method of analyzing a signal according to claim 19, wherein the step of constructing a lower envelope of the signal includes connecting the identified local minimum values with cubic spline fitting; and the step of constructing a upper envelope of the signal includes connecting the identified local maximum values with cubic spline fitting.